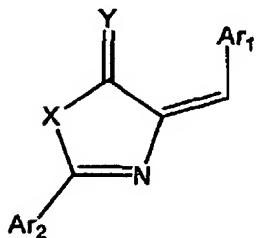


WHAT IS CLAIMED IS:

1. A glucagon-like peptide-1 receptor agonist having the following structural formula:

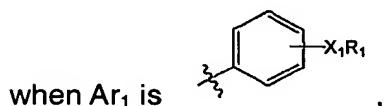


wherein, each of Ar<sub>1</sub> and Ar<sub>2</sub> independently is phenyl or substituted phenyl, and the substituent groups of the said substituted phenyl is one, two or three groups optionally selected from the following group: alkyl; hydroxyl; substituted alkoxy or alkylamino which contains the substituent groups including halogen, alkoxy or hydroxyl; substituted alkanoylxy or alkanoylamino which contains the substituent groups including halogen, alkoxy or hydroxyl; C<sub>2</sub>-C<sub>6</sub> alkenyl substituted with oxygen or amine, phenyl, benzyl, C<sub>2</sub>-C<sub>6</sub> enoyl, C<sub>3</sub>-C<sub>6</sub> cycloalkanoyl, benzoyl, substituted benzoyl which contains optional one, two or three substituent groups including alkoxy and alkanoylamino, benzyloyl, thenoyl, tert-butoxycarbonyl, adamantane formoxyl, and mandeloyl; alkoxy; alkylamino; cycloalkoxy; cycloalkylamino; amino; amide; alkoxycarbonyl; cycloalkoxycarbonyl; alkanoylxy; alkanoylamino; cycloalkanoylxy; cycloalkanoylamino; carbamido; urylene; alkanoyl; nitro; carboxyl; and aldehyde group;

X is O, S, or NH; and

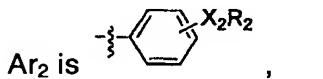
Y is O or S.

2. The glucagon-like peptide-1 receptor agonist according to the claim 1, being characterized in that

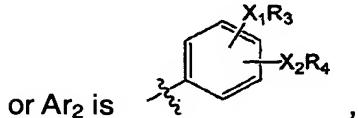


wherein R<sub>1</sub> is any one of the following substituent groups: H; alkyl; substituted alkyl which contains the substituent groups including halogen, alkoxy or hydroxyl; C<sub>2</sub>-C<sub>6</sub> alkenyl; C<sub>3</sub>-C<sub>6</sub> cycloalkyl; phenyl; benzyl; alkanoyl; substituted alkanoyl which contains the substituent groups including halogen, alkoxy or hydroxyl; C<sub>2</sub>-C<sub>6</sub> enoyl; C<sub>3</sub>-C<sub>6</sub>

cycloalkanoyl; benzoyl; substituted benzoyl which contains optional one, two or three substituent groups including alkoxy and alkylamino; tert-butoxycarbonyl; benzyloyl; thenoyl; adamantane formoxyl; and mandeloyl; and  $X_1$  is O or NH,

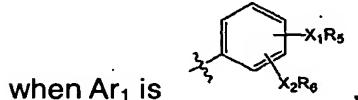


wherein R<sub>2</sub> is any one of the following substituent groups: H; alkyl; substituted alkyl which contains the substituent groups including halogen, alkoxy or hydroxyl; C<sub>2</sub>-C<sub>6</sub> alkenyl; C<sub>3</sub>-C<sub>6</sub> cycloalkyl; phenyl; benzyl; alkanoyl; substituted alkanoyl which contains the substituent groups including halogen, alkoxy or hydroxyl; C<sub>2</sub>-C<sub>6</sub> enoyl; C<sub>3</sub>-C<sub>6</sub> cycloalkanoyl; benzoyl; substituted benzoyl which contains optional one, two or three substituent groups including alkoxy and alkylamino; tert-butoxycarbonyl; benzyloyl; thenoyl; adamantane formoxyl; and mandeloyl; and X<sub>2</sub> is O or NH;



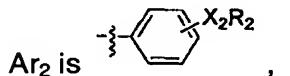
wherein each of R<sub>3</sub> and R<sub>4</sub> independently is any one of the following substituent groups: H; alkyl; substituted alkyl which contains the substituent groups including halogen, alkoxy or hydroxyl; C<sub>2</sub>-C<sub>6</sub> alkenyl; C<sub>3</sub>-C<sub>6</sub> cycloalkyl; phenyl; benzyl; alkanoyl; substituted alkanoyl which contains the substituent groups including halogen, alkoxy or hydroxyl; C<sub>2</sub>-C<sub>6</sub> enoyl; C<sub>3</sub>-C<sub>6</sub> cycloalkanoyl; benzoyl; substituted benzoyl which contains optional one, two or three substituent groups including alkoxy and alkylamino; tert-butoxycarbonyl; benzyloyl; thenoyl; adamantane formoxyl; and mandeloyl; and X<sub>1</sub> is O or NH; X<sub>2</sub> is O or NH.

3. The glucagon-like peptide-1 receptor agonist according to the claim 1, being characterized in that,

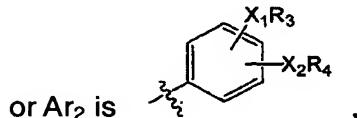


wherein each of R<sub>5</sub> and R<sub>6</sub> independently is any one of the following substituent groups: H; alkyl; substituted alkyl which contains the substituent groups including halogen, alkoxy or hydroxyl; C<sub>2</sub>-C<sub>6</sub> alkenyl; C<sub>3</sub>-C<sub>6</sub> cycloalkyl; phenyl; benzyl; alkanoyl; substituted alkanoyl which contains the substituent groups including halogen, alkoxy or hydroxyl; C<sub>2</sub>-C<sub>6</sub> enoyl; C<sub>3</sub>-C<sub>6</sub> cycloalkanoyl; benzoyl; substituted benzoyl which contains

optional one, two or three substituent groups including alkoxyl and alkylamino; tert-butoxycarbonyl; benzoyl; thenoyl; adamantane formoxyl; and mandeloyl; and  $X_1$  is O or NH;  $X_2$  is O or NH,

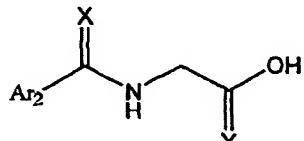


wherein R<sub>2</sub> is any one of the following substituent groups: H; alkyl; substituted alkyl which contains substituent groups including halogen, alkoxyl or hydroxyl; C<sub>2</sub>-C<sub>6</sub> alkenyl; C<sub>3</sub>-C<sub>6</sub> cycloalkyl; phenyl; benzyl; alkanoyl; substituted alkanoyl which contains substituent groups including halogen, alkoxyl or hydroxyl; C<sub>2</sub>-C<sub>6</sub> enoyl; C<sub>3</sub>-C<sub>6</sub> cycloalkanoyl; benzoyl; substituted benzoyl which contains optional one, two or three substituent groups including alkoxyl and alkylamino; tert-butoxycarbonyl; benzoyl; thenoyl; adamantane formoxyl; and mandeloyl; and X<sub>2</sub> is O or NH;



wherein each of R<sub>3</sub> and R<sub>4</sub> independently is any one of the following substituent groups: H; alkyl; substituted alkyl which contains substituent groups including halogen, alkoxyl or hydroxyl; C<sub>2</sub>-C<sub>6</sub> alkenyl; C<sub>3</sub>-C<sub>6</sub> cycloalkyl; phenyl; benzyl; alkanoyl; substituted alkanoyl which contains the substituent groups including halogen, alkoxyl or hydroxyl; C<sub>2</sub>-C<sub>6</sub> enoyl; C<sub>3</sub>-C<sub>6</sub> cycloalkanoyl; benzoyl; substituted benzoyl which contains optional one, two or three substituent groups including alkoxyl and alkylamino; tert-butoxycarbonyl; benzoyl; thenoyl; adamantane formoxyl; and mandeloyl; and X<sub>1</sub> is O or NH; X<sub>2</sub> is O or NH.

4. A process for preparing the glucagon-like peptide-1 receptor agonist according to the claim 1, being characterized in that, the said agonist is prepared by condensating

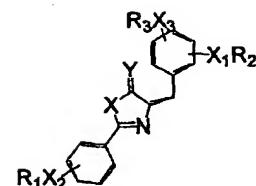


the compound

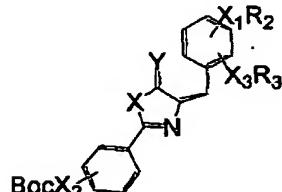
and Ar<sub>1</sub>CHO, wherein each of Ar<sub>1</sub> and Ar<sub>2</sub>

independently is phenyl or substituted phenyl, wherein the substituent group of the said substituted phenyl is one, two or three groups optionally selected from the following group: nitro; carboxyl; aldehyde; tert-butoxycarbonyl and thenoyl substituted with oxygen or amino; X is O, S or NH; and Y is O or S.

5. A process for preparing the glucagon-like peptide-1 receptor agonist according to



the claim 1, being characterized in that, the compound is prepared



by condensating the reaction product of compound and trifluoroacetic acid with the compound  $R_1COX_4$ , wherein  $R_1$ ,  $R_2$  and  $R_3$  are any one of the following substituent groups: H; alkyl; substituted alkyl which contains the substituent groups including halogen, alkoxy or hydroxyl;  $C_2-C_6$  alkenyl;  $C_3-C_6$  cycloalkyl; phenyl; benzyl; alkanoyl; substituted alkanoyl which contains the substituent groups including halogen, alkoxy or hydroxyl;  $C_2-C_6$  enoyl;  $C_3-C_6$  cycloalkanoyl; benzoyl; tert-butoxycarbonyl; substituted benzoyl which contains optional one, two or three substituent groups including alkoxy and alkylamino; benzyloyl; thenoyl; adamantane formoxyl; and mandeloyl; X is O, S, or NH; Y is O or S; each of  $X_1$ ,  $X_2$  and  $X_3$  independently is O or NH; and  $X_4$  is Cl or OH.

6. The processes for preparing the glucagon-like peptide-1 receptor agonist according the claims 4 or 5, being characterized in that, the solvent used in condensation reaction is dichloromethane, acetic anhydride, tetrahydrofuran, dimethylfuran, dichloroethane, toluene, benzene, water, dioxane or any mixture thereof.

7. The processes for preparing the glucagon-like peptide-1 receptor agonist according the claims 4 or 5, being characterized in that, the reaction temperature is from -78°C to the room temperature, or the heating temperature is from 50°C to 230°C.

8. The processes for preparing the glucagon-like peptide-1 receptor agonist according the claims 4 or 5, being characterized in that, pyridine, triethylamine, diethylpropylethyl amine, DMAP, N-methylmorpholine, or isobutyl chloroformate is used as activator in condensation reaction.

9. Use of the glucagon-like peptide-1 receptor agonist according to claim 1 as medicaments for treating the carbohydrate metabolism disturbance-related diseases such as type II diabetes, insensitivity to insulin or obesity, etc.